

04/08/99



jc649 U.S. PTO

☒ Continuation
☐ Divisional
☐ CPA

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

The Commissioner of Patents and Trademarks
 Washington, D.C. 20231

Date: APRIL 6, 1999
 Docket No. PHN 13,726D
 Prior Art Unit 2735
 Prior Ex. B, ZIMMERMAN

Sir:

This is a request for filing a:

- ☐ continued prosecution application ("CPA") under 37 CFR 1.53(d)
- ☒ continuing application under 37 CFR 1.53(b)
- ☒ of pending prior application Serial No. 09/090,002, filed on JUNE 2, 1998 of LEONARDUS G.M. BEUK AND ALBART J. KIP for DEVICE WITH A HUMAN-MACHINE INTERFACE.
- ☒ Enclosed are copies of 14 sheets of specification and 3 drawing sheets (all of which constitutes the specification and drawing in this application) and the Declaration and Power of Attorney as filed in the parent application.
- ☒ Amend the specification by inserting before the first line as a centered heading: --Cross Reference To Related Applications--; and insert below that as a new paragraph --This is a ☒ continuation ☐ divisional of application Serial No. 09/090,002, filed JUNE 2, 1998 pending; which is a continuation of Serial No. 08/758,983 filed December 2, 1996, which issued as U.S. Patent No. 5,844,600; which is a continuation of 08/267,265, filed June 1, 1994, abandoned; which is a continuation of Serial No. 07/881,016, filed May 8, 1992, abandoned.
- ☒ An appointment of associates is enclosed.
- ☐ As last amended, the title has been changed to
- ☐ As last amended, the name of applicant(s) has changed to
- ☒ Before calculating the filing fee, cancel in this application original claims 2-16.
- ☒ The filing fee is calculated below:

CLAIMS AS FILED IN THIS APPLICATION					
For	Number Filed	Number Extra	Rate	Basic fee	
Total Claims	6 - 20 =	X \$18	=		\$ 760
Independ. Claims	1 - 3 =	X \$78	=		
Mult. Dependent Claims, if any	(\$260)		=		
Total Filing Fee	-----				
					\$760.00

09/288410 04/08/99

jc530 U.S. PTO
09/288410

04/08/99

- [X] Please charge the filing fee calculated above, plus any additional fees which may be required except for the Issue Fee, or credit any overpayment to Deposit Account No. 14-1270.
- [X] Priority of application Serial No. 91201314.1 filed on MAY 31, 1991 in EUROPE, is claimed under 35 U.S.C. 119.
- [X] The certified copy of the priority application was filed in prior application Serial No. 07/881,016.
- [X] This application is assigned to U.S. PHILIPS CORPORATION by way of the assignment filed in application Serial No. 07/881,016.
- [X] Address all future communications to Corporate Patent Counsel, U.S. Philips Corporation, 580 White Plains Road, Tarrytown, New York 10591.
- [X] A preliminary amendment to this application is enclosed.
- [] Enter in this application the amendment under 37 C.F.R. 1.116 which was unentered in the prior application.
- [X] An Information Disclosure Statement is enclosed.
- [X] An Authorization Pursuant to 37 CFR 1.136(a)(3) is enclosed.



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I hereby certify that this paper and/or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

JOSEPHINE CANGELOSI
Typed Name


Signature

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Atty. Docket

LEONARDUS G.M. BEUK ET AL

PHN 13,726D

Serial No.

Group Art Unit:

Filed: CONCURRENTLY

Examiner:

DEVICE WITH A HUMAN-MACHINE INTERFACE

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

APPOINTMENT OF ASSOCIATES

Sir:

The undersigned Attorney of Record hereby revokes all prior appointments (if any) of Associate Attorney(s) or Agent(s) in the above-captioned case and appoints:

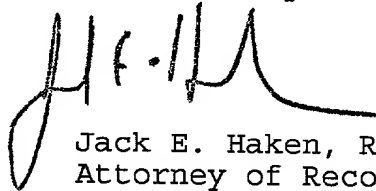
ANNE E. BARSCHALL

(Registration No. 31,089)

c/o U.S. PHILIPS CORPORATION, Intellectual Property Department, 580 White Plains Road, Tarrytown, New York 10591, his Associate Attorney(s)/Agent(s) with all the usual powers to prosecute the above-identified application and any division or continuation thereof, to make alterations and amendments therein, and to transact all business in the Patent and Trademark Office connected therewith.

ALL CORRESPONDENCE CONCERNING THIS APPLICATION AND THE LETTERS PATENT WHEN GRANTED SHOULD BE ADDRESSED TO THE UNDERSIGNED ATTORNEY OF RECORD.

Respectfully,



Jack E. Haken, Reg. 26,902
Attorney of Record

Dated at Tarrytown, New York
this 7TH day of APRIL, 1999.

663342 "07488200

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Atty. Docket

LEONARDUS G.M. BEUK ET AL

PHN 13-726D

Serial No.

Group Art Unit:

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Examiner:

Title: DEVICE WITH A HUMAN-MACHINE INTERFACE

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION

Page 1, line 19, change "devices'" to --device's--;
line 21, change "users'" to --user's--;
line 23, change "etcetera" to --et cetera--;
line 25, delete "for example", change ", others" to --.
Others.--;
line 26, delete "for example";
line 27, change "performing" to --perform--;
Page 2, line 2, change "the" to --his or her--;
line 15, delete "said";
line 20, after "device" insert --,(comma);
Page 3, line 11, after "for" (first occurrence) insert --an--;
Page 5, line 20, delete "the" (second occurrence);
Page 6, line 16, change "an" to --a--; after "interface" insert

--; and--;

line 19, insert --

Fig. 3a is a flow chart of the operation of one embodiment of box 12 of Fig. 2;

Fig 3b is a flow chart of the operation of a second embodiment of box 12 of Fig. 2;--;

line 20, delete "an example of an embodiment";

line 21, after "device" insert --101--;

line 26, change "etcetera" to --et cetera--;

line 28, change "the" (second occurrence) to --his--;

Page 7, line 2, change "dialling" to --dialing--;

line 7, delete "for";

line 27, after "15" insert --, see box 301--;

line 29, after "12" insert --, see box 302--;

line 30, after "17" insert --, see box 303--;

line 31, after "12" insert --, see box 304--;

Page 8, line 15, after "15" insert --, see box 301--; after
"indication" insert --, see box 302--; after "16"
insert --, see box 305--;

line 16, after "information" insert --, see box 306--;
after "17" insert --, see box 303--;

line 17, after "effected" insert --, see box 304--;

Page 9, line 4, delete "the" (second occurrence);

line 5, before "physically" insert --and--; change "an"
to --of--;

line 21, after "used" insert --to--;

line 22, before "detect" insert --to--;

1. *Chlorophyll a* (Chl *a*) is the primary photosynthetic pigment in most plants and algae. It is a green pigment that absorbs light energy in the blue and red regions of the visible spectrum. Chl *a* is located in the thylakoid membranes of chloroplasts.

2. *Chlorophyll b* (Chl *b*) is an accessory pigment that absorbs light energy in the blue and orange-red regions of the visible spectrum. It is located in the thylakoid membranes of chloroplasts.

3. *Carotenoids* are a group of pigments that absorb light energy in the blue and orange-red regions of the visible spectrum. They are located in the thylakoid membranes of chloroplasts.

4. *Xanthophylls* are a group of carotenoids that absorb light energy in the blue and orange-red regions of the visible spectrum. They are located in the thylakoid membranes of chloroplasts.

5. *Lutein* is a xanthophyll that absorbs light energy in the blue and orange-red regions of the visible spectrum. It is located in the thylakoid membranes of chloroplasts.

6. *Zeaxanthin* is a xanthophyll that absorbs light energy in the blue and orange-red regions of the visible spectrum. It is located in the thylakoid membranes of chloroplasts.

7. *Violaxanthin* is a xanthophyll that absorbs light energy in the blue and orange-red regions of the visible spectrum. It is located in the thylakoid membranes of chloroplasts.

8. *Anthocyanins* are a group of pigments that absorb light energy in the blue and orange-red regions of the visible spectrum. They are located in the vacuoles of plant cells.

9. *Flavonoids* are a group of pigments that absorb light energy in the blue and orange-red regions of the visible spectrum. They are located in the vacuoles of plant cells.

10. *Anthoxanthins* are a group of pigments that absorb light energy in the blue and orange-red regions of the visible spectrum. They are located in the vacuoles of plant cells.

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[illegible][illegible][illegible][illegible]

1. *Chlorophyll a* (Chl *a*) is the primary photosynthetic pigment in most plants and algae. It is a green pigment that absorbs light energy in the blue and red regions of the visible spectrum. Chl *a* is essential for the light-dependent reactions of photosynthesis, where it converts light energy into chemical energy.

2. *Chlorophyll b* (Chl *b*) is an accessory pigment found in green plants and algae. It absorbs light energy in the blue and orange-red regions of the visible spectrum. Chl *b* transfers the absorbed energy to Chl *a* for use in photosynthesis.

3. *Carotenoids* are a group of pigments that include carotenes and xanthophylls. They absorb light energy in the blue and green regions of the visible spectrum. Carotenoids play a role in light harvesting and also protect the photosynthetic apparatus from damage by excess light energy.

4. *Xanthophylls* are a subclass of carotenoids that include pigments like lutein and zeaxanthin. They absorb light energy in the blue and green regions of the visible spectrum. Xanthophylls are involved in light harvesting and photoprotection.

5. *Anthocyanins* are water-soluble pigments that give plants red, purple, and blue colors. They are not directly involved in photosynthesis but can protect plants from damage by absorbing excess light energy and acting as antioxidants.

6. *Phycobilins* are pigments found in cyanobacteria and red algae. They absorb light energy in the blue and green regions of the visible spectrum. Phycobilins are part of the phycobilisome, a protein complex that captures light energy and transfers it to Chl *a*.

7. *Phycocyanin* is a blue pigment found in cyanobacteria and red algae. It absorbs light energy in the blue and green regions of the visible spectrum. Phycocyanin is part of the phycobilisome.

8. *Allophycocyanin* is a blue-green pigment found in cyanobacteria and red algae. It absorbs light energy in the blue and green regions of the visible spectrum. Allophycocyanin is part of the phycobilisome.

9. *Peridinin* is a red pigment found in dinoflagellates. It absorbs light energy in the blue and green regions of the visible spectrum. Peridinin is part of the peridinin-chlorophyll *a* protein complex.

10. *Diatoxanthin* is a yellow pigment found in diatoms. It absorbs light energy in the blue and green regions of the visible spectrum. Diatoxanthin is part of the diatoxanthin-chlorophyll *a* protein complex.

11. *Diadinoxanthin* is a yellow pigment found in diatoms. It absorbs light energy in the blue and green regions of the visible spectrum. Diadinoxanthin is part of the diadinoxanthin-chlorophyll *a* protein complex.

12. *Zeaxanthin* is a yellow pigment found in many plants and algae. It absorbs light energy in the blue and green regions of the visible spectrum. Zeaxanthin is involved in light harvesting and photoprotection.

13. *Lutein* is a yellow pigment found in many plants and algae. It absorbs light energy in the blue and green regions of the visible spectrum. Lutein is involved in light harvesting and photoprotection.

14. *Violaxanthin* is a yellow pigment found in many plants and algae. It absorbs light energy in the blue and green regions of the visible spectrum. Violaxanthin is involved in light harvesting and photoprotection.

15. *Flavonoids* are a large group of pigments that include flavones, flavonols, and flavanones. They absorb light energy in the blue and green regions of the visible spectrum. Flavonoids are involved in various plant processes, including light harvesting and photoprotection.

16. *Anthoxanthins* are a group of pigments that include flavones and flavonols. They absorb light energy in the blue and green regions of the visible spectrum. Anthoxanthins are involved in various plant processes, including light harvesting and photoprotection.

17. *Anthocyanidins* are a group of pigments that include anthocyanins and anthocyanidins. They absorb light energy in the blue and green regions of the visible spectrum. Anthocyanidins are involved in various plant processes, including light harvesting and photoprotection.

18. *Anthocyanins* are a group of pigments that include anthocyanins and anthocyanidins. They absorb light energy in the blue and green regions of the visible spectrum. Anthocyanins are involved in various plant processes, including light harvesting and photoprotection.

19. *Anthocyanins* are a group of pigments that include anthocyanins and anthocyanidins. They absorb light energy in the blue and green regions of the visible spectrum. Anthocyanins are involved in various plant processes, including light harvesting and photoprotection.

20. *Anthocyanins* are a group of pigments that include anthocyanins and anthocyanidins. They absorb light energy in the blue and green regions of the visible spectrum. Anthocyanins are involved in various plant processes, including light harvesting and photoprotection.

[illegible][illegible]

- [illegible]


[illegible]

19. The method of claim 17 wherein the confirmatory user manifestation is a manual actuation.
20. The method of claim 19 wherein the confirmatory user manifestation is pushing a button.
21. The method of claim 17 wherein the information relevant is an audible message.
22. The method of claim 17 wherein the confirmatory user manifestation is an analog actuation.

REMARKS

The present continuation adds claims commensurate with the scope of the disclosure.

Respectfully submitted,

By 
Anne E. Barschall
Reg. No. 31,089
914-333-9624

Device with a human-machine interface.

The invention relates to a device with a human-machine interface.

From the German Offenlegungsschrift DE 3700913 a user control interface for a computer device is known, in which the control organs are keyboard keys, which can be actuated by pressing. Images corresponding to the keys are displayed together on a display screen, providing an identification of the function associated with each key.

In order to press a key, the user has to take the prior action of placing a finger on the key, and the device has means to detect this prior action. Upon placing the finger on the keyboard, the corresponding key on the display is highlighted, for example by changing its color. Upon pressing, a function of the key is effected. In this way, after touching the key, the user is given the option of giving a follow-up to the impending actuation by pressing the key, or, if an undesired key is touched, removing the finger without pressing the key. Thus, the physically impending actuation (touching) is a precondition for actuation (pressing), but the actuation need not inevitably follow the impending actuation.

In this way, the user can operate the keyboard and check which key is about to be actuated without having to divert the eyes from the display screen.

The known device has the problem that it occupies at least part of the devices' output interface, even when no keys are to be actuated. In this way it reduces the amount of other information that can be passed by the output interface. It also diverts the users' attention without useful purpose. Apart from reducing the capacity for communication with the user, this may even be dangerous, for example in vehicles, like cars, (motor-)bicycles etcetera, which have many systems pertaining to them, that is, systems that are operable under normal driving circumstances. Some of these systems, like for example the lighting system, are essential for the driving vehicle, others, like for example heating systems, car radios, telephones, navigation systems or cassette player performing a supporting function. Such systems may be operated while the

5 organs without looking, has to be minimized.

10

15 means for, upon said detecting, temporarily disclosing via output means, an indication of the selected function to the user.

20

25 serves as a signal that further progression of the movement will lead to actual actuation.

Upon detecting such impending actuation, the device with a human-machine interface according to the invention brings the function of the control organ temporarily to the attention of the user by disclosing an indication of that function. This indication may be the name of the function or simply a distinctive warning signal. If the indication corresponds to the one desired by the user, the user will proceed with the coherent movement and actuate the control organ, the actuation being effected for example by pressing, or turning, or holding the control organ for some time. If the indicated function is not

desired, the user will not proceed to the actual actuation stage, thus averting execution of an undesired function.

Since the device with a human-machine interface is arranged such that the indication is temporary, some time after the actuation the indication will no longer be perceptible. Thus the users' attention will not be distracted for an indefinite amount of time.

In principle, all control organs of a device with a human-machine interface may be provided according to the invention, but in practice it may suffice to arrange only potentially damaging or irreversible control functions, like switching off headlights of a car or detuning a car radio, in this way.

An embodiment of the device according to the invention is characterized, in that the output means are general purpose output means. General purpose output means are usable for communicating more than one type of item of information, like indication of different functions, via the same communication channel to the user. For example, the same spot on a display screen may be used for disclosing indications of different functions, depending on the function for which impending actuation is detected.

An embodiment of the user control device with a human-machine interface according to the invention, is characterized, in that the output means comprise means for disclosing the indication with an audible message. This has the additional advantage that the indication will be perceptible no matter where the user is looking: the user is not visually burdened by the device with a user control interface at all. An audible message moreover intrinsically only discloses information temporarily during the time it is uttered.

An embodiment of the device according to the invention is characterized, in that it is a device pertaining to a vehicle. Especially in vehicles, like cars, motorcycles etc. it is advantageous that the users' eyes are not unduly drawn from the road.

Another embodiment of the device with a human-machine interface according to the invention is characterized, in that the output means comprise a head up display, arranged for temporarily projecting the indication upon a windscreen. Thus, the user need not divert from the normal (drivers) viewing direction of the eyes to verify

the control function.

In another embodiment of the device with a user control interface according to the invention, the control organ is provided outside the normal line of sight from a drivers position. The control organs may be provided for example with a cover, or placed adjacent to the drivers seat or underneath it, or be made undistinguishable from their surroundings. This has the advantage that the user will not be tempted to avert the eyes from the road. Additionally, it reduces the number of controls visible on the dashboard, which is advantageous for aesthetic and ergonomic reasons. Moreover, in automobiles, this makes it more difficult for would-be thieves to evaluate the features of a parked car.

In a further embodiment of the device with a human-machine interface according to the invention, the control organ is part of a coherently placed group of control organs for activating respective functions from a function group, the indication being indicative of said function group as a whole. This is advantageous because it helps the user to get an overall indication of which group of control organs is being approached. Of course, in this case the means for detecting the user action may be provided detecting impending actuation of further control organs in the group as well and not just for detecting impending actuation of only one control organ. When there are several groups of control organs, indication of the group being approached will aid in finding the right group. When the function group is reassignable (the same group of control organs for example being assignable to control of a car radio or to control of a car telephone) this will moreover serve to inform the user whether the desired group of functions is assigned.

Accordingly, in another embodiment of the device with a human-machine interface according to the invention, it comprises means for redefining the function group and the respective functions.

In an embodiment of the device with a human-machine interface according to the invention, device with a human-machine interface comprises means for detecting a first and second stage of said user action, the device with a human-machine interface being arranged such that the first stage is representative of physically impending entry into the second stage, the second stage being representative of physically impending actuation of the control organ, the device with a human-machine

interface comprising means for, upon detecting the first stage, temporarily disclosing said indication, and upon detecting the second stage, disclosing, via the general purpose output means, a further indication which, within the group of control organs, is specific for the control organ. In this way the advantages of the group indication and the single
5 control organ indication are combined.

In a further embodiment of the device with a user control interface according to the invention, it is arranged for effecting said disclosing only when, after detecting said user action, actuation of the control organ is not detected within a predetermined period of time. In this way the user can avoid being burdened by the
10 disclosing through acting quickly, for example within a predetermined time of a few tenths of a second. This is convenient for example for experienced user, or for a user which is already confident about the function of the control organ after trying a neighboring control organ.

In another embodiment of the device with a user control interface
15 according to the invention it is arranged for disabling the disclosing when actuation of the control organ is detected. In this way, once the decision to execute the control function is effected, the user is not burdened longer than necessary by the disclosing.

In a further embodiment of the device with a user control interface according to the invention, it is arranged for disclosing a further indication of the function
20 when actuation of the control organ is not detected the within a further predetermined period of time after detecting said user action. Thus a hesitant user can be helped, for example by providing help information explaining the function of the control organ; a useful time interval before providing help information is in the order of several seconds.

In an embodiment of the device with a user control interface according to
25 the invention, the control organ is arranged for analog actuation of the function. Analog control settings tend to be hard to reproduce and should preferably not be altered inadvertently. Hence, for example a tuning dial, or a loudness control knob may be arranged for disclosing indication of their function in order to prevent inadvertent manipulation.

30 In a further embodiment of the device with a user control interface according to the invention, it comprises proximity sensing means for generating a user action detection signal, the proximity sensing means being arranged to be responsive to appro-

ach of a human finger. This is advantageous in a vehicle because in such an environment the user is usually reaching for a control organ, that is, unlike in using a computer keyboard, it is a problem to find the plurality of control organs itself. By providing for a response as soon as the user approaches the control organ it is made easier to find the
5 control organs.

The device with a user control interface according to the invention can advantageously be used in car radios and car telephones. By using their sound interface for disclosing the function of the control organs, an extra output interface need not be necessary.

10

These and other advantageous aspects of the device with a human-machine interface according to the invention will be illustrated using the following Figures.

15 Figures 1a, 1b, 1c show an embodiment of the successive types of actuation of control organs in an device with a human-machine interface

Figure 2 shows a schematic diagram of an implementation of the device with a human-machine interface according to the invention

20 In Figures 1a, 1b, 1c an example of an embodiment a group 10 of control organs 11, 12, 13 for a device with a user control interface is shown. By way of example, the control organs are shown as push buttons which can be pushed by a finger 14. Conventionally, to select one button 12 from the plurality 10, the user must look at the control organs to ensure that the finger is placed on the desired button 12 from the
25 plurality 10.

In vehicles, like cars, (motor)bicycles etcetera in which the user at the same time is responsible for controlling for example the steering wheel and the brakes, it is undesirable that the user should divert the eyes to look at the plurality of control organs 10. Preferably, this should even be made impossible, by placing the control
30 organs outside the normal line of sight from the drivers seat, for example under a cover. Yet, for instance to control a car radio, the user must reach for the control organs; pushing one button reached blindly, that is, without looking at it first, is likely

to cause errors, which may be hard to correct -for example in the case of detuning the car radio- or costly -for example in dialling a wrong telephone number on a car phone. An error may even be damaging or dangerous in case the control button pressed erroneously concerns the driving of the car.

- 5 To prevent such errors, the device with a user control interface according to the invention provides, upon detection of a user action representative of impending actuation of a control organ, for an indication of the function of that control organ in such a way that the user can still prevent the function from being effected by not pursuing the action beyond the stage that lead the interface to conclude that actuation
- 10 was physically impending. To prevent the user from being unnecessarily distracted by the mechanism for giving this indication, the indication is made available via a standard output interface used for different types of messages. It is made available temporarily, only for a limited time after detection of impending actuation of the control organ, that is, it is made perceptible to the user only at an attempt to actuate a function. This -
- 15 minimizes distraction to the user, as is essential in a vehicle.

Of course a device with a human machine interface without normally perceptible control organs will be useful in other environments than vehicles as well.

- To achieve such an interface, the idea is that an actuating action by the user will have successive stages, the interface effecting the function of the control organ only in
- 20 the final stage, and in earlier stages providing indication of the function of the control organ selected. Thus, the user may avoid effecting the function by selectively breaking off the action before the final stage is reached.

- To illustrate the principle, in Figures 1a, 1b, 1c, the successive stages are triggered by successive distances of approach of the finger 14 to the control organ 12.
- 25 The distance of the finger may for example be sensed by a proximity sensor operating by means of light, sound or heat. The stage of physically impending actuation occurs in Figure 1a when the finger 14 passes the border indicated by line 15; when the device with a human-machine interface detects this, it provides an indication of the function associated with the control organ 12. Actual actuation is effected in Figure 1b when the
- 30 finger 14 passes the border 17; this causes the device with a user control interface to effect the function associated with the control organ 12. The impending actuation is a physical precondition for the user to perform actuation.

It may be convenient to provide means for detecting two or more stages of actuation of all control organs. However, often it will be more attractive to do so for control organs corresponding to important functions only or for functions which are not easily reversible. This may be more convenient for economic reasons or for giving a
5 higher alerting effect to the indication.

The control organs are often coherently placed in groups of control organs which control related functions. For example in an automotive environment, the controls for heating are placed together, the controls for the car radio are placed together. It may be desirable to report first the function of the group and then the
10 function of a specific control organ before effecting that function. For example to help the user to find a desired group more quickly by giving a coarse indication of the position of the finger. A way to achieve this is illustrated in Figure 1c, where an intermediate actuation stage is detected when the finger 14 passes the border 16. In an device with a human-machine interface comprising three borders 15, 16, 17, the first
15 border 15 might trigger function group indication, the second border 16, specific control organ information and the third border 17 might cause the function to be effected.

Function group indication is also particularly useful when the function of a group of control organs may be reassigned as a group, for example when the same control
20 organs selectably either control a car telephone or a car radio. In this case the function group indication serves to warn the user when the function group must be reassigned.

Although the invention was discussed above with respect to pushbuttons, the invention is applicable to any kind of control organs, such as for example potentiometers, either of the rotating or of the sliding variety.

25 It will be appreciated that there exist various possibilities for implementing detection mechanism for actuation and impending actuation of control organs. The only essential point is that the mechanisms are arranged for detecting more than one physical stage in an action that may lead to actuation, and that these stages are arranged in such a way that, when used by a human user, successive stages are physi-
30 cally preconditions for later stages, but that the later stage may also be foregone if the user decides to.

In its conceptually simplest form this is achieved by providing individual

- control organs with at least two sensing mechanisms, one for detecting the physically impending actuation, another for detecting the actual actuation, the one being sensitive to an earlier stage of approach of a finger than the other. However, for the purpose of the invention, there need not be a physical relation between means for detecting
- 5 actuation, physically impending actuation and a particular control organ:
- 1) the detecting mechanisms for actuation and impending actuation may be separated physically, that is, be located at geometrically different locations,
 - 2) the detecting mechanisms may be shared among control organs,
 - 3) several control organs may be provided as a single physical device.
- 10 To illustrate these possibilities: 1), for example if a push button is used for detecting the actuation, and an optical sensor is used for detecting the impending actuation, there is no need to place the pushbutton and the optical sensor together, as long as they sense the finger in the same region. To illustrate 2), using touch sensitive buttons for
- 15 detecting the impending actuation (that is, for example capacitive sensors, which are actuated by touching rather than by exerting force) and a force sensor to detect the second actuation, the force sensor may be shared by several control organs since touching of a touch sensor is sufficient to determine which control organ is to receive the actual actuation. This has the advantage that it is guaranteed that both the impending and actual actuation will automatically correspond to the same control organ. To illu-
- 20 strate 3), one may use a common touch sensitive surface provided with means to determine the coordinates of a point where it is touched; the coordinate values are used to select one virtual control organ and detect the impending or actual actuation for this control organ; in this way one sensor serves for a plurality of control organs. Since according to the invention the functions of the control organs are identified with
- 25 separate messages, such a touch tablet would require no further distinguishing marks to identify the control organs. Thus, an automobile, or indeed any control interface in any application outside a vehicle, could be provided without visible control organs.

There is also an ample choice of sensors. One implementation uses a proximity sensor for impending actuation (the presence of a proximate object being

30 detected using reflected or absorbed light, sound, electric or magnetic fields etc.) and a push button for detecting the actual actuation. Alternatively, the control organ may be sensitive independently to pushing and touching (without pushing) so as to detect the

impending and actual actuation as a consequence of pushing and touching respectively. In another embodiment, the control organ is a normal control organ, for example a pushbutton, which serves to detect the impending actuation; the actual actuation is detected if the button is kept pushed during a predetermined period of time (that is, long enough for the user to realize a mistake from the indication triggered by the first actuation).

In any case, several actuation signals, corresponding to different stages of actuation will have to be derived for the control organ.

Figure 2 shows an embodiment of an device with a human-machine interface according to the invention. For simplicity, only one control organ 12 is shown, which has outputs 31, 32, 33 for three signals corresponding to detection of the first and second stages of impending actuation and the actual actuation respectively (the second stage being optional). In the embodiment, the first detection output is coupled to a sound signal generation circuit 22, which in turn is coupled to a loudspeaker 20. When the impending actuation is detected, for example after crossing the line 15 in Figure 1a, the function of the control organ can thus be identified via the loudspeaker. In a vehicle, the use of such an audible indication has the advantage that it does not distract the eyes of the user from the road, and that no distracting signals for the user are present until a control organ is almost actuated. Preferably, the signal generator 22 produces a spoken message, for example by replaying a recorded message or using a speech synthesizer, but other signals, such as warning tones which identify functions as dangerous may also be useful.

Alternatively, one may use a display driver 22 and a head up display screen for projecting the information on the windscreen upon detection of impending actuation.

Another output 32 of the control organ 12 is for signalling that the actual actuation is detected, which will effect the function of the control organ. The effecting is symbolized in Figure 2 by connection of the output 32 to an activating input of a subsystem 21 for function execution.

Several elaborations to the device with a human-machine interface, which are not essential to its functioning, but may be added to give substantial improvements to its effectiveness in minimizing the amount of unnecessary distraction of the users

First of all, it may be convenient to interrupt the indication of a function once the function is activated by effecting the actual actuation. This is symbolized in Figure 2 by a switch 23 controlled by the output for the second mode 32 between the signal generator and the loudspeaker. In this way, unnecessary messages are cut short; it may even be convenient to give a slight delay (of the order of a few tenths of a second) to the signal generation 22 in order to enable the unhesitating user to avoid any signalling at all.

20 Furthermore, it may be convenient to provide for additional help
information for an extremely hesitating user, by allowing an impending actuation signal
to pass through a time duration thresholding circuit 24 for triggering a help information
generating circuit. In this way, when the state of impending actuation persists, but is not
followed up by actuation within, for example, a few seconds, additional help informati-
25 on can be reported via the loudspeaker 25.

Although Figure 2 has been drawn in the form of a schematic diagram, isolating several functions in separate boxes, it will be appreciated that the part of the interface providing the links between the control organ 12 and the output 20 can also be implemented as a program in a computer system.

1. A device with a human-machine interface, the device comprising an actuatable control organ for selectably controlling a function of the system, the device comprising means for detecting a user action representative for physically impending actuation of the control organ, the device having means for, upon said detecting, temporarily disclosing via output means, an indication of the selected function to the user.
2. A device according to Claim 1, characterized, in that said output means are general purpose output means.
3. A device according to Claim 2, characterized, in that the output means comprise means for disclosing the indication with an audible message.
4. A device according to Claim 1, 2 or 3, characterized, in that it is a device pertaining to a vehicle.
5. A device according to Claim 4, characterized, in that the output means comprise a head up display, arranged for temporarily projecting the indication upon a windscreen.
6. A device according to Claim 4, characterized, in that the control organ is provided outside the normal line of sight from a drivers position.
7. A device according to any one of the Claims 1 to 6, characterized, in that the control organ is part of a coherently placed group of control organs for activating respective functions from a function group, the indication being indicative of said function group as a whole.
8. A device according to Claim 7, characterized, in that it comprises means for redefining the function group and the respective functions.
9. A device according to Claim 7 or 8, characterized, in that interface device comprises means for detecting a first and second stage of said user action, the interface device being arranged such that the first stage is representative of physically

impending entry into the second stage, the second stage being representative of physically impending actuation of the control organ, the interface device comprising means for, upon detecting the first stage, temporarily disclosing said indication, and upon detecting the second stage, disclosing, via the general purpose output means, a further indication which, within the group of control organs, is specific for the control organ.

10. A device according to any one of the Claims 1 to 9, characterized, in that it is arranged for effecting said disclosing only when, after detecting said user action, actuation of the control organ is not detected within a predetermined period of time.

10 11. A device according to any one of the Claims 1 to 10, characterized, in that it is arranged for disabling the disclosing when actuation of the control organ is detected.

12. A device according to any one of the Claims 1 to 11, characterized, in that it is arranged for disclosing a further indication of the function when actuation of the control organ is not detected the within a further predetermined period of time after detecting said user action.

13. A device according to any one of the Claims 1 to 12, characterized, in that the control organ is arranged for analog actuation of the function.

14. A device according to any one of the Claims 1 to 13, characterized, in
20 that it comprises proximity sensing means for generating a user action detection signal,
the proximity sensing means being arranged to be responsive to approach of a human
finger.

15. A device according to Claim 3, 4 or 5 which is a car radio.

16. A device according to Claim 3, 4 or 5 which is a car telephone.

[illegible]

ABSTRACT:

Device with a human-machine interface.

A device with a human-machine interface for use as a user control interface, particularly in an automotive environment, which temporarily makes an indication of the function of a control organ perceptible, when the user begins to actuate it, but has not yet definitively actuated it. The device with a human-machine interface
5 helps the user to find the right control organ, or warns about dangerous control organs. Moreover, ways of finding groups of control organs and verifying the setting of groups of control organs are made possible.

Figures 1a, 1b, 1c

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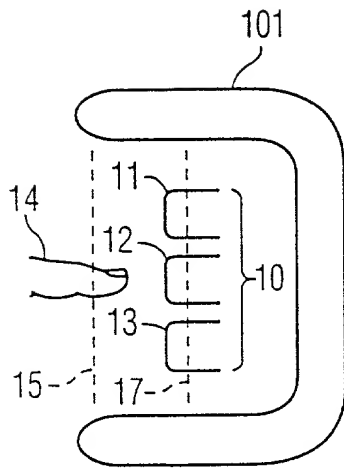


FIG. 1a

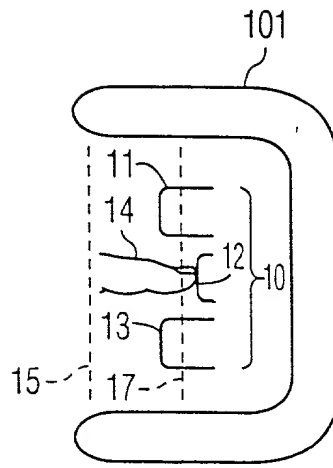


FIG. 1b

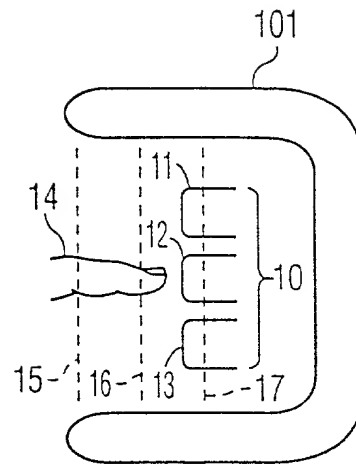


FIG. 1c

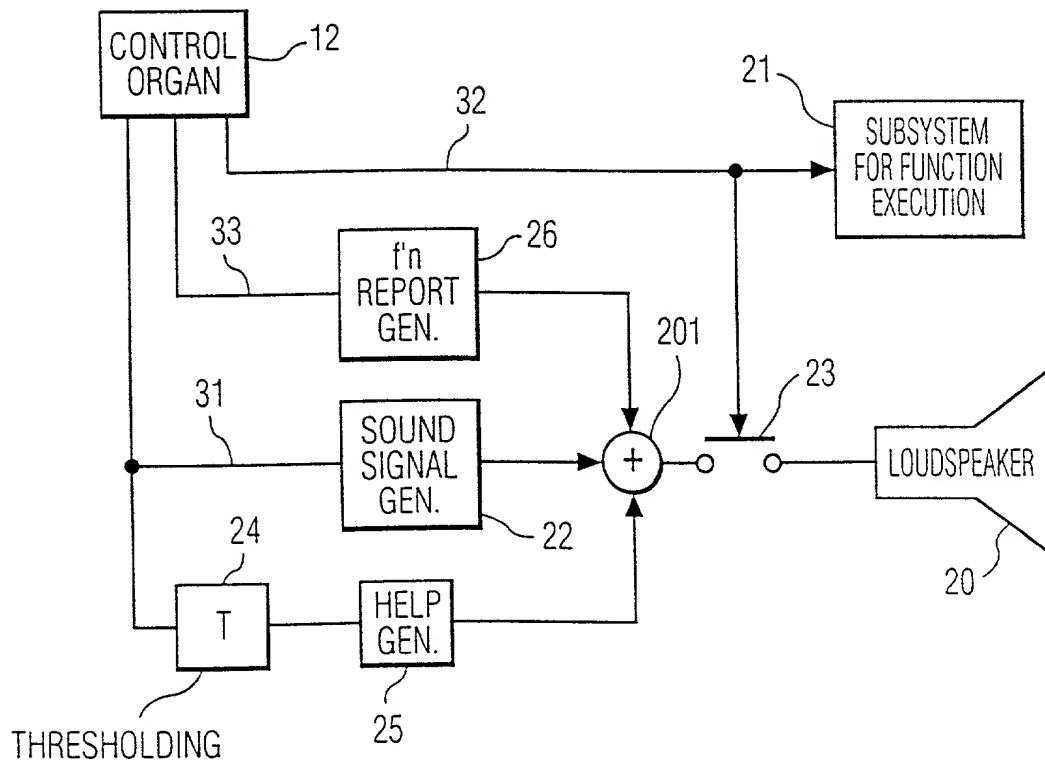


FIG. 2

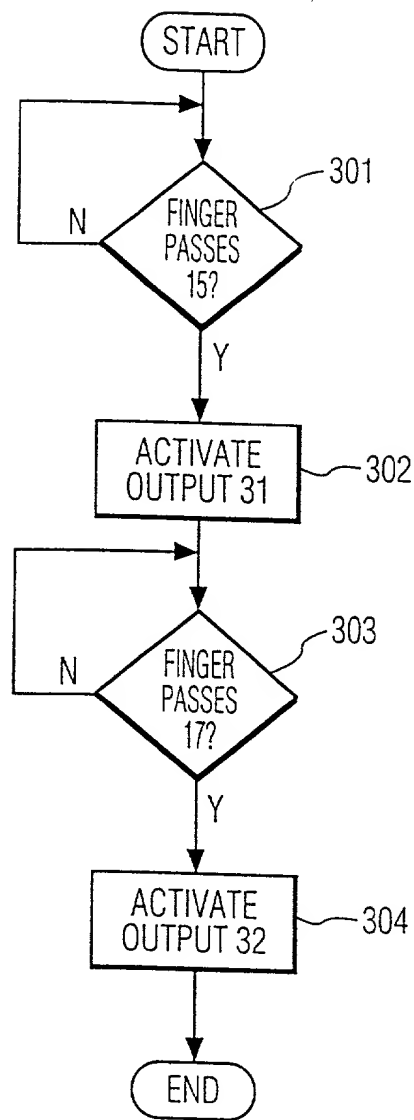


FIG. 3a

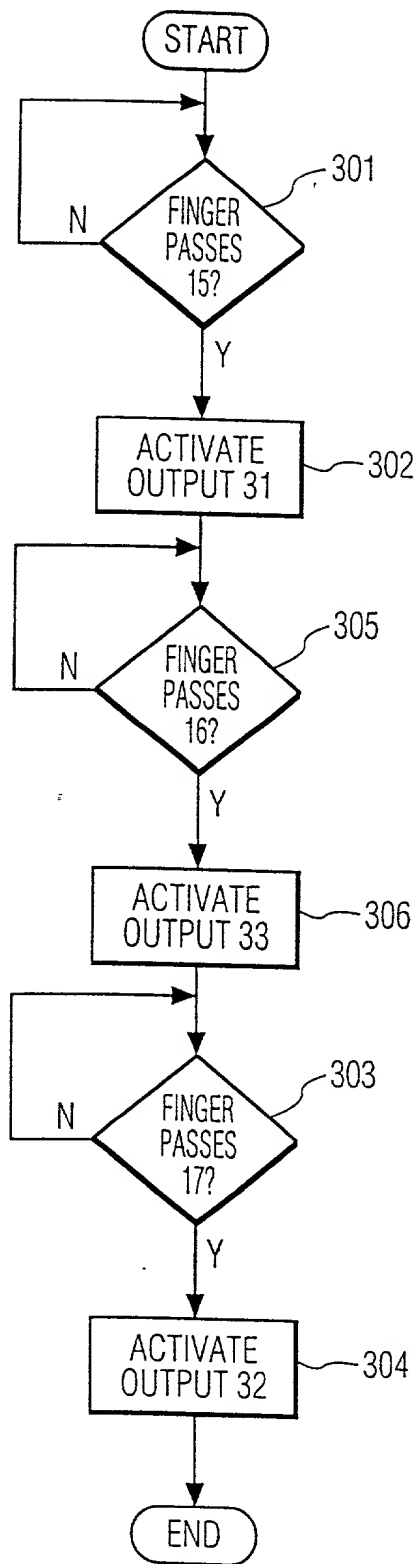


FIG. 3b

DECLARATION AND POWER OF ATTORNEY

Sole/Joint

Attorney's Docket No.
PHN 13.726 US

As a below named inventor, I hereby declare that:
My residence, post office address and citizenship are as stated below next to my name.
I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

"Device with a human-machine interface."

the specification of which (check one)

☐ is attached hereto.

☒ was filed on May 8, 1992 as Application Serial No. 881,016 and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56 (a).

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

PRIOR FOREIGN APPLICATION(S)

COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY Claimed Under 35 U.S.C. 119
Europe	91201314.1	31-5-1991	YES <u>X</u> NO <u> </u>
			YES <u> </u> NO <u> </u>

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35 United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

PRIOR UNITED STATES APPLICATION(S)

APPLICATION SERIAL NUMBER	FILING DATE	STATUS (PATENTED, PENDING, ABANDONED)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

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